What is claimed is:

1.   A method for performing motion analysis on a sequence of images, where said sequence of images captures a plurality of objects each moving along a trajectory in an imaged area, said method comprising:

extracting motion information for each of said plurality of objects contained in said sequence of images; and

determining spatial patterns from said extracted motion information.

2.   The method of claim 1 wherein said determining of spatial patterns comprises:

determining a route comprising a trajectory of a first object having the same trajectory of at least one other object.

3.   The method of claim 2 wherein said determining of said route comprises:

determining whether said trajectory of a second object is within a threshold distance said trajectory of said first object; and

including, if said trajectory of said second object is within the threshold distance, said trajectory of said second object in said route.

4.   The method of claim 1 wherein said determining of spatial patterns comprises:

determining a source point and a destination point from said trajectory of said plurality of objects.

5.   The method of claim 4 wherein said determining said source point comprises:

determining whether a number of trajectories originating from a location is greater than a threshold number; and

identifying, if the number of trajectories originating from the location is greater than the threshold number, the location as said source point.

6.   The method of claim 4 wherein said determining said destination point comprises:

      determining whether a number of trajectories ending at a location

5   is greater than a threshold number; and

      identifying, if the number of trajectories ending at the location is greater than the threshold number, the location as said destination point.

7.   The method of claim 4 wherein said source point and said

10   destination point are determined using a clustering process.

8.   The method of claim 1 further comprising:

      determining spatio-temporal patterns from said determined spatial patterns along a time dimension.

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9.   The method of claim 8 wherein said determining of spatio-temporal patterns comprises:

      determining a busy time for said route, where the busy time represents a time when a number of trajectories for said plurality of

20   objects along said route is greater than a threshold number.

10.   The method of claim 8 wherein said determining of spatio-temporal patterns comprises:

      determining a periodicity of at least one trajectory in said route.

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11.   The method of claim 10 wherein said determining the periodicity comprises:

      selecting a time scale; and

      determining whether a first occurrence of an event along said route

30   and time scale is periodic with subsequent occurrences of said event along the same route and time scale.

12.   The method of claim 11 wherein said event comprises said trajectory of said first object.

13.   The method of claim 11 wherein said event comprises a number of said trajectories greater than a threshold value.

5   14.   The method of claim 1 further comprising:

determining a first route comprising a trajectory common to a first set of at least two objects;

determining a second route comprising a trajectory common to a second set of at least two objects; and

10   determining whether said trajectory in said first route is time correlated with said trajectory in said second route.

15.   A method for displaying motion information of objects contained in a sequence of images, the method comprising:

15   performing a query on a plurality of spatial patterns stored in a database, where each of said plurality of spatial patterns comprises a route determined from a trajectory common to at least two objects moving in an imaged area captured in said sequence of images;

determining a trajectory satisfying at least one constraint specified

20   in said query; and

displaying said determined trajectory on a user interface.

16.   A system for performing motion analysis on a sequence of images, the apparatus comprising:

25   a motion extraction system for receiving said sequence of images capturing a plurality of objects each moving along a trajectory, and extracting motion information for each of said plurality of objects over said sequence of images; and

a motion mining system for determining spatial patterns from said

30   extracted motion information, where said spatial patterns comprise a route determined from said trajectory common to at least two objects.

17.   The system of claim 16 further comprising a video source for capturing said plurality of objects in an imaged area and transmitting

video containing said captured plurality of objects to said motion extraction system.

18. The system of claim 16 further comprising:

5   a database for storing said spatial patterns determined from said motion mining system; and

a server computer for retrieving said trajectory satisfying at least one constraint specified in a query.

10 19. The system of claim 16 wherein said spatial patterns comprise a route having a trajectory of a first object that is the same as the trajectory of at least one other object.

20. The system of claim 16 wherein said spatial patterns comprise a

15 source point and a destination point for said trajectories of said plurality of objects.

21. The system of claim 16 wherein said motion mining system determines spatio-temporal patterns from said spatial patterns along a

20 time dimension.

22. An apparatus for performing picture analysis, the apparatus comprising:

a memory for storing a motion mining program;

25   an interface for receiving motion information containing trajectory information for a plurality of objects captured in an image sequence;

a processor, upon executing said motion mining program retrieved from said memory, determines spatial patterns from the received motion information.

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23. The apparatus of claim 22 wherein said spatial patterns comprise a route having a trajectory of a first object that is the same as the trajectory of at least one other object.

24. The apparatus of claim 22 wherein said spatial patterns comprise a source point and a destination point for said trajectories of said plurality of objects.

5 25. The apparatus of claim 22 wherein said processor determines spatio-temporal patterns from said spatial patterns along a time dimension.